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Operational and Mission Highlights

A MONTHLY SUMMARY OF TOP ACHIEVEMENTS

July 2021

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Laboratory Conducts Excalibur Subcritical Experiment Preliminary Design Review

The first portion of the Preliminary Design Review (PDR) for the upcoming Excalibur subcritical experiment focused on the updated physics design and diagnostic requirements, diagnostic interfaces to the experimental device, and the neutron-diagnosed subcritical experiment (NDSE) subsystem. During a subcritical experiment, the plutonium mass is subcritical, and the plutonium density remains subcritical before, during, and after the experiment. Thus, a self-sustaining chain reaction is not possible, so the entire experiment proceeds without generating any nuclear yield.

During the second portion of the PDR, Excalibur experiment engineering focused on the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) hydrodynamic experiment and the confirmatory experiment, including device component manufacturing, blast hardware, detonator cable assemblies, and in-vessel fielding hardware.

Pit Technologies Division Plans Ahead and Meets Goals During July 4 Holiday Week

A short operations week such as the July 4, 2021, holiday can sometimes serve as an interruption to work at the Laboratory's Plutonium Facility (PF-4), but thanks to strategic planning, the Pit Technologies Division completed a full week's worth of achievements, despite the break.

One example is the PF-4 logistics team, which performs multiple jobs every day, such as introducing items into gloveboxes for work and conducting bag-outs to remove waste from the gloveboxes. With some planning, the logistics team supported bag-outs in two material management rooms in sequence to compensate for a short holiday week. This accelerated process enabled personnel to move the same amount of waste as would normally be expected during a regular workweek.

Waste removal is important to ensure availability of gloveboxes for a variety of work related to pit production. The logistics team, formed in 2020, enabled other groups in the Pit Technologies Division to focus on their specialized work without having to worry about tasks such as waste removal.

Specialized Monitoring Developed for High-Priority Weapons 3D Simulation on Trinity

The Laboratory's High Performance Computing (HPC) Division worked with XTD (X-Theoretical Design), CCS (Computer, Computational and Statistical Sciences), and XCP (X Computational Physics) divisions to develop and implement specialized monitoring for high-priority weapons 3D simulations on the Trinity supercomputer. This work will enable HPC-SYS (Systems) to have 24/7 operations. The HPC-ENV (Environments) consulting team, weapons designer principal investigator, and the code team worked together to ensure forward progress is made on this particular scope of work. The capabilities of the Trinity supercomputer support the NNSA Stockpile Stewardship program's certification and assessments to ensure that the nation's nuclear stockpile is safe, reliable, and secure.

Storage Upgrades Improve Data Protection, Workflow for Nuclear Security Simulations

Complex computer simulations for the stockpile stewardship program generate great quantities of information. A constant challenge with such information is the capability to store it and make it accessible to national security scientists. The issue is that the ability of processors to generate simulation data has grown much faster than improvements associated with storage technologies.

To help meet this challenge, the Laboratory deployed Campaign Storage for production use in 2015.

This data storage system sits between High Performance Computing scratch systems and the High Performance System Storage archive. Through a coordinated effort to archive older data, Laboratory staff members completed a needed software upgrade to Campaign Storage while dramatically reducing system unavailability.

In addition, the project provided the ability to reformat the system to increase data protection methods (more erasure coding), so that data will remain safe until new hardware, delayed by the COVID-19 pandemic, can be delivered. The new hardware will increase performance, efficiency, and availability to users while also reducing the burden of keeping the old system running smoothly.

Subcritical Experiment Successful with the Help of TA-55 Divisions

On June 22, 2021, the Nightshade B subcritical experiment (SCE) was successfully executed at the U1a Complex of the Nevada National Security Site. Nightshade B is the second of three SCEs planned as part of the Red Sage–Nightshade series, each with multiple independent experimental devices all initiated almost simultaneously inside a single confinement vessel.

Workers at TA-55 and in the Materials Science and Technology Division (within the Associate Laboratory Directorate of Physical Sciences) played a critical role in producing the targets used in this experiment. Four divisions within the Associate Laboratory Directorate of Weapons Production came together to overcome a number of challenges to cast, machine, inspect, assemble, package, and support unpacking and gas operations in Nevada. Lessons learned were applied to fabrication and assembly of the more complex targets to support success in the next series. The SCE series will help inquire important data to support the NNSA mission.

Two 1E40 Detonator Production and Sales Hit Benchmark

As part of the B61-12 Life-Extension Program (LEP), the Laboratory is the Design Agency (DA) and Production Agency (PA) for the 1E40 detonator, the first detonator designed, tested, manufactured, and fielded since the Cold War. The Laboratory's DA and PA collaborate for this product line, along with the Production Agency Quality (PAQ) Division. Employees from these organizations have implemented a first-of-its-kind continuous production process that enables the constant and consistent production and acceptance of these detonators for next-level assembly.

In June 2021, the collaborators achieved a significant benchmark with this process when two sublots of detonators were successfully accepted and diamond stamped by NNSA within two months of one another. The exceptionally collaborative environment that exists between the DA and PA facilitated this accomplishment — it was furthermore made possible by outstanding coordination with all supporting organizations, including PAQ's Product Verification and Submittal team who coordinated the sales with NNSA's Los Alamos Field Office. These efforts will contribute to the further success of the 1E40 detonator product line.

SCIENCE, TECHNOLOGY, AND ENGINEERING

2021 LANL Space Weather Summer School Continues Through the End of the Month

From June 1 through July 31, 2021, the 2021 LANL Space Weather summer school is taking place under the directorship of Gian Luca Delzanno of Applied Mathematics and Plasma Physics (T-5), Fan Guo of Nuclear & Particle Physics, Astrophysics and Cosmology (T-2), and Mike Henderson of Space Science and Applications (ISR-1).

Nine students are enrolled in the school, which combines a series of lectures given by Laboratory staff (including a widely attended lecture on the Manhattan Project by Laboratory Senior Historian Alan Carr) and specific student projects across a variety of research areas in space physics. Students will present their work through a seminar at the beginning of August. Such seminars provide an additional chance for Laboratory staff to engage further with the summer school.

Black Holes, Quantum Entanglement, and the No-Go Theorem

In a *Scientific American* article, Laboratory scientists Zoë Holmes and Andrew Sornborger (both from CCS-3, the Information Sciences group) write about how their team, along with collaborators, has focused on studying algorithms for quantum computers and, in particular, machine-learning algorithms — what some like to call artificial intelligence. The research sheds light on what sorts of algorithms will do real work on existing, noisy, intermediate-scale quantum computers, and on unresolved questions in quantum mechanics at large.

In particular, they have been studying the training of variational quantum algorithms. The researchers set up a problem-solving landscape where the peaks represent the high-energy (undesirable) points of the system, or problem, and the valleys are the low-energy (desirable) values. To find the solution, the algorithm works its way through a mathematical landscape, examining its features one at a time. The answer lies in the deepest valley. The researchers wondered if they could apply quantum machine learning to understand scrambling. This quantum phenomenon happens when entanglement grows in a system made of many particles or atoms. As the entanglement among particles within the quantum system grows, the information

spreads widely. This scrambling of information is key to understanding quantum chaos, quantum information science, random circuits, and a variety of other topics.

Eric Brown Named President of The Society for Experimental Mechanics

A scientist in the Laboratory's Office of Experimental Sciences (OES), Eric Brown has been named president of The Society for Experimental Mechanics (SEM), a professional society for scientists and engineers in that field. SEM connects international members from academia, government, and industry. Members are committed to interdisciplinary application, research and development, education, and active promotion of experimental methods.

"SEM aspires to be the international professional society for scientists and engineers in the field of experimental mechanics across multiple technical disciplines, including the dynamic behavior of materials, which has featured strongly in my career," Brown said. "I am excited and honored to be starting my term as the 2021–2022 President."

At the Laboratory since 2003, Brown has focused on the study of dynamic behavior of materials and high explosives. Such research and development work includes fracture and damage of complex heterogeneous polymers and polymer composites for energetic, reactive, and structural applications, including crystalline phase transitions, plasticity, and dynamic loading conditions. His early work included much of the pioneering work into self-healing materials.

Future Computing Architectures – a Path Toward Understanding Needs

Computer scientists at the national laboratories are always trying to obtain the best performance from simulation codes. At the Laboratory's Computational Systems and Software Environments (CSSE) program, researchers have been investigating how to determine the best an application can do in using vector units in modern processors.

Determining the performance improvement bounds of applications can help developers decide how much effort to spend to optimize a code. Understanding these

bounds also helps computer scientists shape computing architectures for national security applications.

Tools have been developed to estimate answers to these questions for a set of important applications, thus ensuring best efficiency from the Laboratory's codes on current and future platforms.

Mapping the World's Megaflashes

An article by Laboratory scientist Michael Peterson (ISR-2, the Space and Remote Sensing group) published in the Albuquerque Journal tells readers about lightning "megaflashes," noting that great strides have been made in documenting and analyzing this spectacular type of lightning. Megaflashes can exceed 62 miles in length and occur throughout the southern Great Plains in North America and the La Plata basin in South America.

Previously, these large flashes could be detected only if they happened to occur in specific regions monitored by a special type of sensor called the Lightning Mapping Array, invented at New Mexico Tech. But now, thanks to a set of new geostationary satellites developed by the National Oceanic and Atmospheric Administration, megaflashes can be identified wherever and whenever they occur over most of the western hemisphere.

Last year, the World Meteorological Organization confirmed two new record-setting megaflashes. The first was for the longest bolt, which stretched horizontally from the coast of Brazil 440 miles into Argentina — this is roughly equivalent to traveling from Albuquerque to Denver. The second record was for duration of flash — another bolt detected in Argentina lasted 16.7 seconds, about the time it takes to watch a short television commercial.

These records more than doubled anything previously documented. From analyzing these and other megaflashes, scientists have learned more about Earth's climate and the nature of lightning worldwide. Such studies have also led to important safety realizations that should change how people respond to these electrical storms.

Neutron-Clustering Effect in Nuclear Reactors Demonstrated for First Time

For the first time, researchers demonstrated the long-theorized neutron-clustering effect in nuclear reactors. According to a new study recently published in the journal *Nature Communications Physics*, the demonstration of this effect could improve reactor safety and create more accurate simulations.

"The neutron-clustering phenomenon had been theorized for years, but it had never been analyzed in a working reactor," said Nicholas Thompson, an engineer with the Los Alamos Advanced Nuclear Technology Group. "The findings indicate that, as neutrons fission and create more neutrons, some go on to form large lineages of clusters, while others quickly die off, resulting in so-called 'power tilts,' or asymmetrical energy production."

Understanding these clustering fluctuations is important for safety and simulation accuracy, particularly as nuclear reactors first begin to power up. "We were able to model the life of each neutron in the nuclear reactor, basically building a family tree for each," said Thompson. "What we saw is that even if the reactor is perfectly critical, so the number of fissions from one generation to the next is even, there can be bursts of clusters that form and others that quickly die off."

The team found that although generations of neutrons cluster in large family trees while others died off, a complete die-off was avoided in the small reactor because of spontaneous fission, or the non-induced nuclear splitting of radioactive material inside reactors, which creates more neutrons. That balance of fission and spontaneous fission prevented the neutron population from dying off completely, and it tended to smooth out the energy bursts created by clustering neutrons.

New Quantum Research Paper Selected as "Editors Suggestion" in Physical Review Letters

A recent paper co-authored by Diego Dalvit and Wilton Kort-Kamp of Physics of Condensed Matter and Complex Systems (T-4), along with Abul Azad (Center for Integrated Nanotechnologies), was selected as an "Editors Suggestion" in *Physical Review Letters*. The paper, titled "[Space-Time Quantum Metasurfaces](#),"

proposes that modulated quantum metasurfaces can control all properties of photonic qubits, a breakthrough that could benefit the fields of quantum information, communications, sensing, and imaging, as well as energy and momentum harvesting. The results of their study have also been selected to be featured in the American Physical Society's magazine *Physics* under the title "[Quantum Metasurfaces Entangle Photons on Demand](#)."

Paul Fenimore Recognized by NMDOH for COVID-19 Modelling Efforts

On July 13, 2021, U.S. Surgeon General Dr. Vivek Murthy held a roundtable with Governor Michelle Lujan Grisham and a group of New Mexico healthcare workers, including Laboratory scientist Paul Fenimore. The New Mexico Department of Health (NMDOH) credited Dr. Fenimore with developing a modeling framework to evaluate forecasts of COVID-19 spread and potential actions the state could implement under various scenarios. New Mexico's approach from the outset of the pandemic has been based on detailed modeling of the pandemic forecasted 4–6 weeks ahead.

NMDOH says Fenimore's dedication and accuracy with the modeling data assisted the state with managing vaccine effectiveness, school re-openings, ICU bed-use expectations, and many other scenarios critical to managing the pandemic in New Mexico. NMDOH says the state will recognize July 23, 2021 as Dr. Paul Fenimore Day.

Project Offers New Step Toward Studying Emergence, "Materials by Design," and Future Nanomagnets

Using a D-Wave quantum-annealing computer as a testbed, researchers in Physics of Condensed Matter and Complex Systems (T-4) isolated so-called emergent magnetic monopoles, a class of quasiparticles. Such isolation enabled the researchers to create a new approach to developing "materials by design." According to Cristiano Nisoli (T-4), the lead author of the study, the researchers applied a process using Gauss's law to trap monopoles. This process enabled the scientists to observe a monopole quantum-activated dynamics and mutual interaction between them. This work demonstrates that magnetic monopoles not only can emerge from an underlying spin structure, but also can be controlled, isolated, and studied precisely.

Alejandro Lopez-Bezanilla (T-4), who works on the D-Wave processor, noted the results could have technological benefits particularly relevant to DOE and LANL, specifically in the idea of materials by design, to produce future nanomagnets that might show advanced and desirable functionality for sensing and computation. As binary information carriers, monopoles can be relevant to spintronics. They also contribute significantly to the Laboratory's D-Wave investments.

Researchers Explore Alternate Approaches to Standard Nuclear Cross-Section Calculations

Laboratory researchers are exploring a new technique to describe nuclear reactions in a more compact way — this new technique enables faster computer programs that use significantly less memory. The work, published in three related papers in the journal *Physics Review C*, explores alternate approaches to what is known as standard R-matrix parametrization of nuclear cross sections.

"The context of the work," said Mark Paris, one of the two Laboratory authors, "is that nuclear reactions drive energy production in nuclear reactors (producing electricity), the Sun, other stars (producing light and other forms of energy), the early universe (producing all the visible matter we see today), and in nuclear weapons. Describing these applications requires computationally intensive codes that use nuclear physics, describing how nuclei enter into nuclear reactions and the resulting production of energy and matter (nuclei)."

These reactions are described by "cross sections" that depend on how fast the reacting nuclei are moving when they collide. Cross sections give the likelihood or probability that nuclei will react, and these probabilities are calculated using advanced methods of the quantum theory called R-matrix theory.

"Cross sections are usually stored in very long computer files with hundreds of thousands of lines," Paris said. "[However,] new methods have been developed in this trilogy of papers that allow these very long files to be condensed into just a few hundred lines."

Science and Artificial Intelligence Help Unlock Green Energy in Northwest New Mexico

Through an agreement under the Laboratory's New Mexico Small Business Assistance (NMSBA) program, Tosidoh, LLC, a Navajo- and veteran-owned private small business operating and managing on the Navajo Nation, engaged with Lab scientists to investigate the geothermal resources and the aquifer below Tohatchi.

Tosidoh asked for help in understanding what forces were heating the water and what kind of geothermal technology was appropriate. Could the hot water be used to produce green hydrogen from water through electrolysis to heat buildings and to grow crops in a greenhouse system? Company personnel also wanted to know how extensive the underground reservoir was, how much water it contained, and whether they could sustainably pump it to support the proposed commercial enterprises.

Laboratory scientists had the expertise to help answer all these questions, and the NMSBA program provided a no-cost vehicle to engage that expertise. Now in its 20th year, NMSBA has connected a few thousand small businesses across New Mexico to technical experts and technology at Los Alamos and Sandia National Laboratories, the New Mexico Manufacturing Extension Partnership, the University of New Mexico, New Mexico State University, and New Mexico Tech.

For the Tosidoh project, the Laboratory team applied its expertise in artificial intelligence (AI) and geothermal energy. The Laboratory began geothermal research nearly 50 years ago and pioneered numerous new techniques in the field. On the AI side, the Lab has developed a cutting-edge AI tool, known as SmartTensors, that has proved itself in identifying and characterizing geothermal sites around New Mexico and across the United States. The team used SmartTensors to sift through the vast information from the Tohatchi-area wells to find the hidden patterns that make the data understandable, shedding light on the contents and character of the aquifer and geothermal resources.

TA-55 Guest Scientist Receives Nuclear Technology R&D Award

First Lieutenant Ashwin Rao, a guest scientist at the Laboratory and a PhD candidate at the US Air Force (USAF) Institute of Technology, recently received the USAF and DOE Nuclear Technology R&D Award. USAF

and DOE give this award to a student with significant R&D efforts that support nuclear technology, and it is a competition among scientists from around all USAF research institutions.

Rao's contributions at the Laboratory have been primarily associated with the Laboratory's Material Recycle & Recovery (MRR) program, which supports pit production efforts. Rao made significant contributions in a machine-learning technique applied to the hand-held laser-induced breakdown spectroscopy (LIBS) instrument. The technique can offer simple and efficient analysis inside of gloveboxes holding legacy items (metals and materials) set for discard.

The process not only adds efficiency to processes in the plutonium facility that involve material analysis and movement but also provides a greater level of safety for workers. The award and Rao's contributions will bring awareness to the achievements and science happening at the Laboratory's plutonium facility.

Target Fabrication Group Machines First Classified Beryllium Part

This achievement increases NNSA's classified beryllium-target fabrication capability in support of deterrence mission drivers.

Moreover, the National Ignition Facility Discovery Science Oxygen Opacity campaign recently completed first experiments to measure oxygen opacities relevant to White Dwarf stars. The goal of this experimental campaign is to measure oxygen opacities to better understand cooling rates in White Dwarfs, which place constraints on the age of the Universe, using the Opacity-on-NIF (National Ignition Facility) spectrometer. This effort is a collaboration between Los Alamos, Lawrence Livermore, and Sandia National Laboratories; the Nevada National Security Site; and the University of Texas.

TikTok Video Featuring Laboratory Scientist Goes Viral

Cathy Plesko, the Advanced Simulation and Computing program manager for the Laboratory's Verification and Validation Program, was featured on CBS Mission Unstoppable's TikTok channel as part of its campaign to highlight women in science. The short [video](#) features Plesko talking about how scientists are working to defend the planet from a killer asteroid. In just one week, this video has been viewed more than 108,500 times.

Plesko and her team use supercomputers to model what happens if an asteroid or comet hits Earth. The team also uses supercomputers to help determine how people might be able to stop such asteroids or comets from hitting the Earth in the first place.

Using Algorithms, Quantum Computers to Explore Quantum Materials and Sensors

A Laboratory team that includes Marco Cerezo and Patrick Coles of Physics of Condensed Matter & Complex Systems (T-4) is using its recent breakthroughs in quantum algorithms to expand the budding field of quantum sensing. Quantum sensors can be exquisitely sensitive — far better than classical sensors — in applications associated with measuring magnetic fields, detecting photons for quantum cybersecurity, and potentially detecting gravitational waves. Quantum computers rely on entanglement to perform operations. One of the challenges in developing algorithms on current, noisy quantum computers stems from the quantum system inside the computer interacting unintentionally with the surrounding environment. Such unintentional interaction interferes with computation.

Zöe Holmes and Andrew Sornborger of Information Sciences (CCS-3), along with Lukasz Cincio and Coles of Physics of Condensed Matter and Complex Systems (T-4), have developed a new type of algorithm called variational fast forwarding (VFF). A hybrid approach, VFF combines classical and quantum computing to get around the noise problem. VFF sacrifices a little bit of accuracy in calculations to achieve far longer run times and enables simulations to complete without crashing.

MISSION OPERATIONS

Acquisition Services Management Launches Ariba, a New Procurement System

After two years of planning, staging, transitioning, and training, personnel in Acquisition Services Management (ASM) implemented Ariba, the Laboratory's new procurement system. As of June 1, 2021, Ariba has replaced the Lab's former manual and paper-based process with a digital, automated, and web-based system to procure goods and services.

Ariba completely changes the way the Laboratory procures goods, services, equipment, and materials. This

system has automated the end-to-end procurement process, including sourcing, contracting, buying, and invoicing. It also provides transparency into the status of procurements by tracing requisitions throughout the procurement process. This means everyone involved in the procurement process at any point will have an easier, more modernized, and transparent experience.

The procurement system upgrade to Ariba is a part of ASM's ongoing ACE (Agility, Capability, Excellence) transformation project.

DOE Secretary Recognizes ECCCE Project

NNSA shared some good news this week. On July 13, 2021, three NNSA projects received the DOE Secretary's Project Management Achievement Award. One of the Laboratory's completed capital projects was among the three award winners. This capital project, the Exascale Class Computing Cooling Equipment (ECCCE), was recognized for completing work 10 months early and \$20 million under budget.

According to NNSA's official announcement, every year DOE recognizes projects that have demonstrated excellence in project management. Specifically, the Secretary's Achievement Award is presented to project teams that have demonstrated significant results in completing projects under budget and ahead of schedule.

The team responsible for the ECCCE project brought 5,200 tons of cooling capacity to the Nicholas C. Metropolis Center for Modeling and Simulation (aka, the Strategic Computing Complex). This successful project greatly improved the Laboratory's High Performance Computing capability — and, by extension, our nation's deterrent — well into the future.

Fire-Alarm System Upgrades Begin at the Laboratory's Plutonium Facility

A major project is underway to enhanced fire-alarm systems throughout PF-4, the Laboratory's Plutonium Facility. These enhancements will provide employees in several facilities within PIDAS (the Perimeter Intrusion Detection and Assessment System) with an extra layer of protection and safety. This Fire-Alarm System Replacement is an important piece of a larger reinvestment project, which in turn is part of the modernization of the Laboratory's aging infrastructure through

multiple capital line-item projects over the course of several years.

The new system — which complies with National Fire Protection Association standards — will be connected to a single fire-alarm monitor at the local Operations Center. Thus, operations specialists will easily pinpoint the exact location of trouble. A centralized fire-alarm system will be a major safety improvement over the current system, which only indicates that an alarm has been activated "somewhere" in a facility. The fire-alarm upgrades will fulfill the Life Safety portion of the major line-item project, and these upgrades are scheduled to be completed by January 2023.

Flanged Tritium Waste Containers Prove Successful in Radioactive Waste Disposition

Designed by Laboratory personnel, Flanged Tritium Waste Containers (FTWCs) are ASME-rated (American Society of Mechanical Engineers) pressure vessels specifically designed to safely dispose of tritium-containing waste materials. Designed to ensure the safe management of radioactive waste, FTWCs contain tritium gas, tritiated water vapor, and tritiated particulates. As the Laboratory's Weapons Engineering Tritium Facility (WETF) reduces the tritium-contaminated waste footprint, FTWCs help place contaminated legacy items at specially arranged long-term sites.

The first shipment took more than three years to prepare and coordinate, and subsequent shipments are following in a successful cadence. The first high-activity tritium waste offsite disposition departed in June 2020, bound for Nevada National Security Site (NNSS), also marking the first-ever shipment of classified radioactive waste from LANL to NNSS.

The team has shipped four FTWCs to date. The first shipment was completed as a high-priority onsite activity during the COVID-19 pandemic, which means minimal staffing operations in the Laboratory, as well as the implementation of COVID-19 protocols to execute the work safely.

WETF works closely with many other Laboratory organizations to ensure compliance with all Department of Transportation; DOE Radiological Safety, Resource Conservation and Recovery Act (RCRA); New Mexico Environment Department; Environmental Protection Agency; and offsite disposal location requirements prior to shipment.

High Explosives Safety Days Encourage a Culture of Safety

At this year's High Explosives (HE) Safety Days, 13 speakers presented a range of subjects that cover various issues associated with HE, such as the history of HE at the Laboratory, lessons learned, and fire safety.

From June 29 to June 30, 2021, HE Safety Days took advantage of a variety of media, from talks to slide presentations to videos, all of which covered topics in detail. The Laboratory has not experienced a fatal HE incident since 1959, and programs like this one contribute to continued safety awareness.

Conveying tragic events and incidents that could have been tragic — as well as the resultant lessons learned — increase awareness and appreciation for safety by Laboratory personnel. Presentations also covered the ways Lab personnel and county partners collaborate to ensure fire safety, particularly around firing sites.

Key Space in Plutonium Facility Cleaned Out and Made Ready for the Mission

On June 24, 2021, the Laboratory's Aqueous Nitrate Team safely removed combustible material and completed significant housekeeping in a key walk-in enclosure. The team performed this work in support of the Materials Recovery & Recycle (MRR) program.

Highly contaminated, the enclosure had not been used in more than ten years. The area contains an evaporator system used to process effluent streams from the aqueous nitrate line. This capability enables the recovery of plutonium from byproduct streams that result from pit manufacturing. The early planning, coordination and support with an integrated team led to a job well done. Controls included protective equipment, time limitations from conditions associated with heat-stress risk, and the support of a medical response team, in addition to radiological control technicians and subject-matter experts.

With outstanding support from radiation protection and waste personnel, the team safely and expeditiously completed entry/egress from the room to remove the necessary materials. This achievement will enable the space to be effectively used for future production work and to prepare for the readiness process for routine operations.

Laboratory Controller and Finance Divisions Produce and Track Business Stewardship Review Reports that Provide Insights into Organizational Costs

Each month, the Laboratory's Controller Division produces more than 3,600 Business Stewardship Review (BSR) reports that line managers use to review costs incurred by their organizations. The reports provide insights into various labor and non-labor costs. Reviewing and approving these reports ensures that line managers perform a crucial role in confirming that all costs incurred by the Laboratory are

- reasonable,
- allocable to a program authorized under and consistent with the terms of the Prime Contract,
- consistent with Cost Accounting Standards (CAS) Board standards, and
- consistent with generally accepted accounting principles and practices appropriate to the circumstances.

The Laboratory's Finance Division tracks approval metrics and reports them each quarter. In the latest reporting period, line managers approved more than 90 percent of BSR reports within the requested timeline.

Laboratory's LOSA and LOMA Programs Will Hold New Workshops

Both the Laboratory Operations Supervisor Academy (LOSA) and the Laboratory Operations Management Academy (LOMA) have scheduled new workshops. LOSA's next workshop will take place August 17–18, 2021. LOMA's next workshop took place on July 13–14, 2021, at Los Alamos's Fuller Lodge.

LOSA held a new workshop on June 15–16, 2021, at the White Rock Training Center. Known as LOSA Grad, this program provides a learning opportunity for graduates of LOSA or the Safety Academy of Excellence (SAFE) to reinvigorate how managers apply Safe Conduct of Research (SCoR) principles. At this latest LOSA Grad workshop, more than 80 people attended, with the majority from the Associate Laboratory Directorate for Facilities & Operations (ALDFO).

LOMA workshops for leadership and culture development help higher-level managers (5 and 6) better understand and support their first-line managers by executing SCoR principles and passing them down to their work teams. Since the Laboratory started LOMA, 126 leaders in ALDFO have participated.

Laboratory and Private Sector Partners Secure \$4.7 Million in DOE Funding

The Laboratory and private-sector partners have secured \$4.7 million in Technology Commercialization Funds from DOE to accelerate the development of new technologies and solutions to the marketplace.

“These partnerships are an example of what Los Alamos does best, fostering innovation in science and technology to meet the nation’s toughest energy challenges,” said Laboratory Deputy Director for Science, Technology, and Engineering John Sarrao. “We are advancing promising innovations for fuel-cell technology; remote, real-time monitoring of power lines; the use of machine learning on massive geothermal datasets; and more.”

DOE awarded more than \$65 million in public and private funding to 68 projects in late June 2021 to commercialize promising energy technologies from Los Alamos and other national laboratories, to help achieve President Biden’s goal of net-zero carbon emissions by 2050. Laboratory projects and funding amounts are as follows:

- Actinide-Molten Fluoride Salt Property Measurement and Low-Level Detection, with Kairos Power of Alameda, CA (\$1.5 million);
- Additive Manufacturing of Carbon-Carbon Composites with Tailored Thermal Transport Properties, with Northrup Grumman Corp. of Elkton, MD (\$1.4 million);
- DME as a Renewable Hydrogen Carrier: Innovative Approach to Renewable Hydrogen Production, with Oberon Fuels of San Diego, CA (\$1.5 million);
- Terrestrial Energy-Efficient Long-Range Network (TERN) for Remote Monitoring, with a partner (\$125,000); and
- Unsupervised Physics-informed Machine Learning of Complex Natural and Engineered Geoscience Processes, with Julia Computing Inc. of Newton, MA (\$250,000).

Laboratory Personnel Earn Gold Pat Gallagher Award for Cleaning Fuel in Emergency Generators

Eleven staff members from the Associate Laboratory Directorates for Facilities and Operations (ALDFO) and Environment, Safety, Health, Quality, Safety and Security (ESHQSS) earned a gold-level Pat Gallagher Award for the Laboratory’s Emergency Operations Center and the TA-03-440 Tank Polishing Project. The Pat Gallagher Award recognizes exemplary achievement in waste reduction.

The award recognized the team’s collaborative effort to clean, filter, and polish fuels to extract contaminants, thus ensuring a high-quality product that supports the Laboratory’s emergency power generators. The resultant work improved the Lab’s infrastructure by removing water, sludge, and contaminants that corrode tanks — such removal extends the service life of such fuel tanks. Once a tank is polished, it is ready to receive fuel, eliminating the need to dispose of more than 50,000 gallons of contaminated diesel fuel — keeping the fuel onsite realizes significant cost savings. Polishing also greatly reduces amounts of waste, with generated waste limited to only three 55-gallon drums (one drum each of filters, fuel/water mix, and sludge).

Laboratory Uploads Plutonium-Mission Jobs into Fieldglass/AgileOne System

Personnel in the Laboratory’s Associate Laboratory Directorate for Weapons Production (ALDWP) uploaded 34 plutonium-mission job postings in the Fieldglass/AgileOne staff-augmentation system. This upload represents approximately 100 jobs in ALDWP R&D for positions associated with engineers (levels 3 and 4), program managers (levels 1–4), and operations support specialists and other contingent labor positions within the Fieldglass repository, which includes all Laboratory job titles.

A web-based system and managed service provider, the Fieldglass/AgileOne staff-augmentation system enables personnel to procure, track, and manage the Laboratory’s contingent labor. Laboratory hiring managers and staff-augmentation suppliers use the system for contingent-labor job postings, time sheets, expense submittals, and invoicing. As of the middle of June 2021, all positions are available to receive applicant resumes within the Fieldglass/AgileOne system.

The Laboratory expects to expand this effort to support hiring capacity, including other ALDWP and non-ALDWP jobs that support the plutonium mission. ALDWP will engage with associate laboratory directorates such as Facilities and Operations, Business Management, and Environment, Safety, Health, Quality, Safeguards, and Security to explore which jobs are appropriate to post (likely hundreds).

Meenie/Bravo Drop Test Tower: A Tower and Inaugural Test Prove New Capability Success

The Laboratory built a 90-foot tower at the Meenie/Bravo firing site at TA-36 in the High Explosives Area, which had not been in service for more than a decade. To become operational, both the site and its bunker required extensive repairs that necessitated enormous levels of coordination and cooperation across the Laboratory. Constructed during the COVID-19 pandemic, the tower and facility upgrades were completed one month early.

The new 90-foot-tall tower at the Meenie/Bravo site can drop up to 4,500 pounds from about 70 feet. Q-17, the W88 Alteration and Refresh Programs group, used the tower to test the response of a W88 warhead mockup containing live high explosives (HE). The proof test simulated an accidental drop scenario — the final validation needed to demonstrate that the HE would not inadvertently react.

A high-speed camera and onboard accelerometer diagnostics were used to capture the test and provide direct dynamic response data. The test was successful — no kaboom — with high-quality data return.

The facility provides an upgradable drop-test capability. In the future, it can carry heavier loads and deploy additional diagnostics. A range of devices can be dropped — from weapon-related devices to storage and transportation containers. The possibilities are almost endless.

Plutonium-Contaminated Oversized Waste Shipment Frees Up Space at TA-55

On July 12, 2021, Waste Management, working with Weapons Production, successfully shipped plutonium-contaminated oversized waste generated during 2016–2017. The waste consisted of two gloveboxes tak-

en out of service and packaged in a shipping container compliant with Department of Transportation specifications.

Because the gloveboxes contained heavy metals, the waste was considered mixed low-level waste. The collaborators shipped the containers for treatment and disposal to a licensed and permitted commercial facility in Andrews County, Texas. This shipment freed up valuable TA-55 space that can now be used to support other critical plutonium-mission needs.

Prime Contract Management and Policy Offices Merge for Greater Efficiency

The Laboratory's Prime Contract Management and Policy offices have merged as part of an effort to increase efficiency and streamline the development and implementation of Laboratory policies.

The primary mission of the policy component of this new office is to provide clear, concise, and current requirements and guidance to help Laboratory workers effectively and efficiently perform work in a manner that is safe, secure, protects the environment, and meets all contractual, customer, and stakeholder requirements.

The new office's prime contract management element is responsible for managing the prime contract and represents the Laboratory in contract-related negotiations with the NNSA Field Office. The Interface Management Office is also part of the Prime Contract Management Organization.

Process Improvements in PF-4 Lead to Inventory Completion in Record Time

Process improvements are helping reduce the time it takes personnel to complete inventory in the material balance areas (MBAs) at TA-55's Plutonium Facility (PF-4). Inventory is a recurring process to validate that the virtual inventory of nuclear material and special nuclear material accurately matches the physical inventory.

Personnel completed the June 2021 inventory in a record-setting nine working days. This inventory was also the first time in at least half a decade that resulted in zero system-generated action forms, which document

issues identified during the initial stages of the physical inventory.

The April 2021 inventory set the previous record for completion at 14 working days, compared to the average 25 to 30 days. Data for April and June show the top contributions to these successes are improved processes and procedures, better cross-communication, improved pre-inventory preparations, and a decrease in action forms. Since December 2020's inventory, the transition time between inventory steps has improved, reducing total inventory time for a majority of MBAs, enabling for less outage time in PF-4. The changes and improvements have resulted from a collaborative effort between the Nuclear Material Control and Accountability Program and the Associate Laboratory Directorate for Weapons Production.

Process Monitoring Team to Increase Production Availability from 64 Percent to 88 Percent

A collaboration between the Process Monitoring Team, which is part of Nuclear Material Control and Accountability (NMCA) at TA-55, along with Weapons Production personnel, has achieved another milestone toward increasing production availability from 64 percent to 88 percent as part of a holistic improvement effort in PF-4 (the Laboratory's Plutonium Facility). Process Monitoring detects out-of-control conditions and reconciles inventories of nuclear material near-real time, thus enabling continuous reconciliation and increasing the duration to process between inventories.

Production in PF-4 is suspended for approximately 18 weeks each year to inventory processing material balance areas (MBAs), including those involved with pit production. The team's collaboration with AMPP-3 (Actinide Material Processing and Power), which coordinates ARIES (Advanced Recovery and Integrated Extraction System), has already demonstrated process-monitoring performance improvements in the ARIES MBA, as well as significantly decreased downtime. As of June 2021, all plans, procedures, on-the-job training, ARIES-specific statistical process control limits, and simulations have been reviewed and approved. Integrated with other NMCA improvements, Process Monitoring will increase the available production time to less than 37 percent as it reduces downtime from 18 weeks per year to just 6 weeks for inventories.

Resourceful Work by Maintenance & Site Services' Maintenance Programs and Central Execution Gets Crane Back in Working Order

During the annual inspection of a crane traveling overhead (CTO-001) at the Laboratory's Tech Shop (TA03-0039), personnel in the Maintenance & Site Services' Maintenance Programs (MSS-MP) determined that trolley drive gears 3 and 4 within the crane were severely worn. These worn gears meant that the crane failed the inspection.

Waiting 12 weeks for replacement parts was not an acceptable path forward, given that this overhead crane is critical in executing the Tech Shop's support mission. Thus, MSS-MP identified a nearby crane (CTO-002) that had similar gearing but was no longer operational. Working with Industrial Hygiene, the Work Control team quickly updated the integrated work document (IWD). MSS-Central Execution then worked through the weekend to (1) remove the gearing from crane CTO-002; (2) replace the worn, failed gearing on crane CTO-001; and (3) return crane CTO-001 to operation.

Triad Donates Truck for Contest to Thank Laboratory Employees for Getting Vaccinated

Employees and eligible contractors who are fully vaccinated by September 3, 2021, will have an opportunity to enter a drawing for a 2021 Ford F-150 pickup truck sponsored and funded privately by Los Alamos National Laboratory's operator, Triad National Security, LLC. Using no taxpayer dollars, Triad purchased the truck for the contest as a thank you to employees helping protect their families and fellow workers by getting the COVID-19 vaccine. More than 80 percent of employees are vaccinated, and workers who are not may do so onsite. The drawing is open to all Lab employees and employees of Lab contractors Aramark, Centerra, COM-PA, and Performance Maintenance working onsite.

"The health and safety of our employees is our top priority," said Deputy Director for Operations Kelly Beierschmitt. "Triad has taken some of its own money — not taxpayer dollars — to purchase a brand new 2021 Ford F-150 so one vaccinated employee can win a new pickup truck. It's a way to thank employees for their hard work — and to encourage everyone to get the shot."

Utilities and Logistics Teams Respond Quickly to Potable Water Leak at SII TA-55 Prep Facility

On June 1, 2021, at approximately 6 a.m., Marty Cordova of Utilities and Infrastructure (MSS-UI) was notified by the Laboratory's Facility Supervisor about a possible potable water leak at the SII TA-55 Prep Facility. The UI-Duty Officer for the week, Cordova, along with Kevin Graham of Logistics Superintendent Field Work Execution (LOG-SUP), responded to the leak. The duo confirmed the leak on the west side of the facility and near a position-indicating valve.

Cordova and Graham notified all appropriate personnel who could be detrimentally impacted by the leak. A UI-Water Fitter arrived on scene and isolated the leak. UI-Locators were then dispatched to perform emergency locates, and the excavation/fill/soil disturbance (EXID) issue was entered into the system so that work could begin.

Utilities, Laborers, Operators, Teamsters, and Fitters worked closely and safely to excavate the site and repair the system. Work was delayed and had to be restarted because of frequent rainstorms that compromised the integrity of the excavation. Repairs were completed on June 3, 2021, and the system was returned to normal on June 4, 2021. Effective communication was noted among MSS-UI, MSS-TA-55, and LOG-SUP to ensure access to the facility, help streamline and accelerate the progression of the work, and minimize customer potable system downtime.

COMMUNITY RELATIONS

Bradbury Science Museum Educators Excite Kid Scientists at Española Schools

From June 7 through July 1, 2021, educators under the Bradbury Science Museum's (BSM) Summer Science on Wheels program worked in person with more than 400 students at six schools in Española. BSM educators Mel Strong and Chelsea Redman, along with intern Denisse Lerma, visited each school group once a week for three weeks, bringing creative hands-on activities to kindergarten through sixth-grade students. Weekly lessons covered topics in engineering, life sciences, and electric circuits.

Summer Science on Wheels is part of the schools' 21st Century Community Learning Centers program, an out-of-school-time program offered to students free of charge through grant funds. This program provides academic, leadership, and enrichment opportunities for students and families, particularly in under-resourced school districts.

Employee Generosity Provides More Than 700 backpacks for Students Returning to School

As the new school year approaches, Laboratory employees have provided more than 700 backpacks with school supplies to schools and regional partners. These backpacks filled with supplies ensure that children in northern New Mexico return to their classrooms with everything they need to succeed.

Using funds donated by employees through their regular bi-weekly payroll deductions, the Community Partnerships Office (CPO) distributed 95 backpacks to the City of Española's Project RACE (Rio Arriba Community Empowerment), which is holding a supply drive and giveaway on July 31, 2021.

Following feedback from some larger school districts in the region, which stated they did not anticipate a need for Laboratory-supplied backpacks, CPO focused on meeting the needs for the more rural districts in the region. Using employee donations, CPO purchased 650 backpacks with supplies from a local small business, and CPO personnel are distributing them to five rural school districts. Schools will ensure that the resources provided will be given to students who need them most.

Laboratory Celebrates AAPI Heritage Month in May

In May 2021, the Laboratory celebrated Asian American Pacific Islander (AAPI) Heritage Month. On May 26, 2021, the Laboratory's Asian Pacific Islander Employee Resource Group (API ERG) hosted events, shared stories, and distributed useful resources and information on how to overcome racism and promote cultural awareness. Topics highlighted the heritage, diversity, and contributions of Asian American and Pacific Islanders to the Laboratory and beyond.

Discussions included "Diversity at the DOE" with DOE's Chief of Staff Tarak Shah and "Celebrating API heritage at LANL" with Laboratory staff members. Additional

articles included ideas for supporting minority groups, the mission and mentorship program of the API ERG, and significant contributions of current employees, such as Harshini Mukundan and Athena Sagadewan. Content was shared via internal and external channels.

Laboratory Employees Pledge More Than \$370,000 for Scholarships

Laboratory employees pledged more than \$370,000 for a fundraising campaign held on behalf of the 2021 Los Alamos Employees' Scholarship Fund (LAESF), including more than \$70,000 in new pledges and gifts. The campaign encourages Laboratory employees to donate to a fund that awards college scholarships to students throughout northern New Mexico.

Laboratory operator Triad National Security, LLC, also supported LAESF with a contribution, with a particular focus on needs-based scholarships. In the past 22 years, more than 1,800 scholarships worth nearly \$8.5 million have supported local students attending accredited institutions across the country. The scholarships are administered by the LANL Foundation, and all recipients live in one of the seven northern New Mexico counties surrounding the Laboratory. The students demonstrate excellence in academic achievement, leadership, and service, as well as meet rigorous academic- and merit-based requirements.

Laboratory Growth Means Bigger Opportunities for the Region

On July 4, 2021, the *Santa Fe New Mexican* published an [editorial piece](#) by Kelly Beierschmitt, the Laboratory's Deputy Laboratory Director for Operations. In the editorial, Beierschmitt assesses the Laboratory's efforts to move beyond the COVID-19 pandemic, noting that nearly 80 percent of the workforce is now vaccinated, more personnel are returning to work onsite, and that the Laboratory's growth has once again started in earnest. The remainder of the editorial addresses the opening of two offices in Santa Fe to accommodate Lab growth and changes in the region, constructing new office buildings and parking structures in Los Alamos, and addressing the housing needs of new Laboratory employees throughout northern New Mexico.

Local Television Stations Feature Video on Laboratory's New Hazardous Materials Robot

The Laboratory recently purchased a new hazardous materials robot to safely manage and dispose of potentially dangerous materials onsite. A video produced by the Laboratory received feature coverage on local television stations KRQE and KOB-TV. The segments demonstrated the capabilities of the Lab's Hazardous Materials Team and Emergency Response Organizations. The video clip from KRQE can be found [here](#).

Regional Development Corporation Awards \$70,300 to Regional Small Businesses

The Regional Development Corporation (RDC), with support from Laboratory operator Triad National Security, LLC, has awarded under its 2021 Micro-Grant program \$70,300 in grants to 48 small businesses in northern New Mexico. The majority of this year's awardees are rural businesses with fewer than 10 employees. In addition, RDC offers technical assistance to all applicants, even those who did not receive grants.

The fund opens once a year and is available to any type of small business that has an immediate need for a small amount of funding to diversify, sustain or grow revenue, leverage other investments, and/or put proper systems in place that will create job opportunities. The awards were made through a competitive application process.

Awardees include the Rio Grande Hostel and Yacht Club in Embudo (Taos County), a small coffee bar and restaurant; Safety Training Solutions in Velarde (Rio Arriba County), a HUB zone-approved small business offering health and safety instruction and certification; and Pecos River Cabins in Pecos (San Miguel County), which offers year-round, fully furnished, short-term cabin rentals.

Virtual Summer Physics Camp Aims to Inspire Young Women Scientists

This year's Laboratory-hosted Summer Physics Camp for Young Women offered 40 high school students from New Mexico and beyond a unique opportunity to explore science topics and meet a broad range of

female researchers across STEM fields, including astrophysics, engineering, computer science, and chemistry. Led by Anna Llobet (P-1, Dynamic Imaging and Radiography), the camp aims to inspire young women to pursue higher education and careers in STEM, to promote self-efficacy, and to show them female role models.

With support from Los Alamos and Sandia National Laboratories, the New Mexico Consortium, and partners including the LANL Foundation, Los Alamos and Pojoaque Public schools, and Hawaii Science and Technology Museum, the fifth year of the free camp saw students attending from northern and central New Mexico and Hawaii. From June 7 to June 19, 2021, approximately 80 volunteers took part (more than three-quarters of them women), guiding the hands-on activities or giving the students insight into their scientific work. Topics covered included COVID-19 research, the history of women in science, and an update from the Laboratory's Mars rover team.

SELECTED MEDIA COVERAGE

[Los Alamos National Lab Prepares for Fire Season](#)

KRQE (6/23)

Los Alamos National Laboratory is working to protect the wildlands around its campus from fires. In the last couple of years, LANL has removed 2,500 felled trees and donated the wood to local pueblos. They have also upgraded bridges on lab property to better accommodate fire response.

[Los Alamos and Oberon Fuels Receive DOE Funding to Produce Renewable Hydrogen from Renewable DME \(rDME\)](#)

Green Car Congress (6/25)

A public-private partnership between Los Alamos National Laboratory and Southern California-based Oberon Fuels has secured funding from the US Department of Energy (DOE) to scale-up steam reforming technology to produce renewable hydrogen (rH₂) from renewable dimethyl ether (rDME) — a novel pathway for reducing the carbon content of the global hydrogen supply.

[LANL Working on 'Million Mile' Truck](#)

Albuquerque Journal (6/27)

The technology is not particularly new, and neither is the idea. But, using hydrogen as an alternative fuel source through a proton-exchange membrane fuel cell, also known as a polymer electrolyte membrane, is quickly gaining traction. It is something scientists at Los Alamos National Laboratory are looking to make

efficient and cost-effective enough to see it used on a large-scale basis, first with long-haul 18-wheelers and eventually with everyday vehicles.

[Three New Mexicans to Know Who Don't Stop](#)

Albuquerque Business First (6/28)

Rian Bahran, who has been on assignment in D.C., received the prestigious recognition for his work around critical national security matters.

[Why "Nuclear Batteries" Offer a New Approach to Carbon-Free Energy](#)

Space Daily (6/28)

NASA and Los Alamos National Laboratory demonstrated a microreactor for space applications in three years (2015–2018) from the start of design to fabrication and testing.

[America's Healthiest County Has a Lab — and a Formula — for Battling COVID-19](#)

U.S. News (6/29)

Los Alamos County repeats as No. 1 in U.S. News' Healthiest Communities rankings, boasting a reliance on science and a community that proved effective in dealing with the coronavirus.

[Former Los Alamos National Laboratory Director Terry Wallace Retires](#)

Los Alamos Daily Post (6/30)

Terry C. Wallace, Jr., Los Alamos National Laboratory's former director, retired from the Laboratory on June 30, 2021.

[Los Alamos, New Mexico — the Birthplace of the Atomic Bomb — is Ranked the Healthiest Community in the Country for the Second Year in a Row](#)

Daily Mail (6/30)

The small New Mexico county was crowned the healthiest community by U.S. News and World, which assessed nearly 3,000 county and county equivalents in 84 metrics across 10 key categories, including population health, public safety, equity, food and nutrition, and infrastructure for its Healthiest Communities project.

[NASA Marks 60 Years of Nuclear Power in Space](#)

World Nuclear News (6/30)

The plutonium-238 fuel used in NASA's radioactive power systems is provided through a partnership with the US Department of Energy. The isotope is made by irradiating neptunium-237, and is currently produced by Oak Ridge National Laboratory in partnership with Idaho and Los Alamos National Laboratories.

Guarding the Power Grid Against a Natural Enemy

Signal Magazine (7/1)

Scientists at Los Alamos National Laboratory are exploring how to protect the grid against a coronal mass ejection from the sun that could physically damage the nation's electrical infrastructure and knock out power for several weeks with resultant societal chaos and massive economic losses.

In New Mexico, Communities Dependent on Aquatic Recreation, Worsening Drought Could Be Disastrous

Santa Fe New Mexican (7/3)

The effects of climate change — declining snowpack and higher temperatures — have reduced reservoir levels in the Colorado River Basin over the past 20 years, which subsequently reduces flows to New Mexico, said Los Alamos National Laboratory hydrologist Katrina Bennett. "That water isn't being replenished. That is a huge concern."

Black Holes, Quantum Entanglement, and the No-Go Theorem

Scientific American (7/4)

Our team at Los Alamos National Laboratory, along with other collaborators, has focused on studying algorithms for quantum computers and, in particular, machine-learning algorithms — what some like to call artificial intelligence. The research sheds light on what sorts of algorithms will do real work on existing noisy, intermediate-scale quantum computers and on unresolved questions in quantum mechanics at large.

People in Business

Santa Fe New Mexican (7/5)

Los Alamos National Laboratory scientists Miles Beaux and Matt Durham are among 83 scientists across the country to split \$100 million through the U.S. Department of Energy's Early Career Program, which supports research at universities and national laboratories.

New Open-Source Software Checks Quantum Annealers, Including Noise and Qubits

The Science Times (7/6)

Researchers from the Los Alamos National Laboratory have developed new open-source software that could evaluate quantum annealers down to the individual qubit level aside from also characterizing noise.

Bradbury Science Museum Reopens in Time for ScienceFest

Los Alamos Daily Post (7/7)

The Bradbury Science Museum is now open after its 15-month hiatus. Located at 1350 Central Avenue in downtown Los Alamos, the museum is free to all ages.

LANL-Developed Software Evaluates Qubits, Characterizes Noise in Quantum Annealers

HPC Wire (7/7)

High-performance computer users in the market for a quantum annealing machine or looking for ways to get the most out of one they already have will benefit from a new, open-source software tool for evaluating these emerging platforms at the individual qubit level.

LANL Joins Effort to Track Bird-Borne Pathogens with Pandemic Potential

Santa Fe New Mexican (7/10)

Los Alamos National Laboratory is supplying its expertise in genetic research to a consortium that will study birds migrating along a flyway stretching from Africa across the Mediterranean and Black seas to the Arctic, in part as a pandemic-prevention effort.

Neutron-Clustering Effect in Nuclear Reactors Demonstrated for the First Time

Los Alamos Reporter (7/13)

"The neutron-clustering phenomenon had been theorized for years, but it had never been analyzed in a working reactor," said Nicholas Thompson, an engineer with the Los Alamos Advanced Nuclear Technology Group. "The findings indicate that, as neutrons fission and create more neutrons, some go on to form large lineages of clusters while others quickly die off, resulting in so-called 'power tilts,' or asymmetrical energy production." Story also appears in [LA Daily Post](#) and [AZO Quantum](#).

Triad Donates Ford F-150 Truck for Contest to Thank Workers for Getting Vaccinated

Los Alamos Reporter (7/13)

Employees and eligible contractors who are fully vaccinated by Sept. 3, 2021, will have an opportunity to enter a drawing for a 2021 Ford F-150 pickup truck sponsored and funded privately by Los Alamos National Laboratory's operator, Triad National Security. No taxpayer dollars were used to purchase the truck.

Triad National Security Donates Truck for Contest to Thank LANL Employees for Getting Fully Vaccinated by Sept. 3

Los Alamos Daily Post (7/14)

Employees and eligible contractors who are fully vaccinated by Sept. 3, 2021, will have an opportunity to enter a drawing for a 2021 Ford F-150 pickup truck sponsored and funded privately by Los Alamos National Laboratory's operator, Triad National Security. No taxpayer dollars were used to purchase the truck.

D-Wave, Los Alamos Isolate Emergent Magnetic Monopoles Using Quantum-Annealing Computer

Inside HPC (7/15)

Using a D-Wave quantum-annealing computer as a testbed, scientists at Los Alamos National Laboratory have shown that it is possible to isolate so-called emergent magnetic monopoles, a class of quasiparticles, creating a new approach to developing “materials by design.”

LANL and Partners Secure \$4.7 Million in DOE Funding

Los Alamos Daily Post (7/15)

Los Alamos National Laboratory and private-sector partners have secured a total of \$4.7 million in Technology Commercialization Funds from the Department of Energy (DOE) to accelerate bringing cutting-edge energy technologies and solutions to the marketplace.

Why the U.S. Once Set Off a Nuclear Bomb in Space

National Geographic (7/15)

In the unlikely event another nuclear bomb goes off in space, Geoff Reeves, a research fellow at Los Alamos National Laboratory in New Mexico, has been working on a quick way to get rid of radiation belts made from nuclear blasts.

Cosmic Challenge: Protecting Supercomputers from an Extraterrestrial Threat

Physics World (7/17)

“We are like the canary in the coal mine, we’re out in front, studying what is happening,” says [Nathan DeBardeleben](#), senior research scientist at Los Alamos National Laboratory in the US. At the lab’s Neutron Science Centre, he carries out “cosmic stress-tests” on electronic components, exposing them to a beam of neutrons to simulate the effect of cosmic rays.

Oberon, Los Alamos Produce Hydrogen Fuel

San Diego Business Journal (7/18)

Oberon Fuels has teamed up with Los Alamos National Laboratory to create a new way to distribute hydrogen fuel for the tanks of futuristic vehicles. The U.S. Department of Energy lab and the privately held company are each putting \$1.5 million into the effort.

Emergent Magnetic Monopoles Isolated Using Quantum-Annealing Computer

Phys.Org (7/19)

Using a D-Wave quantum-annealing computer as a testbed, scientists at Los Alamos National Laboratory have shown that it is possible to isolate so-called emergent magnetic monopoles, a class of quasiparticles, creating a new approach to developing “materials by design.”

Energy Secretary Recognizes Exceptional Project Management at Los Alamos

Los Alamos National Laboratory (7/19)

The team responsible for managing the Exascale Class Computing Cooling Equipment (ECCCE) project at Los Alamos National Laboratory was recognized by the Secretary of Energy with an Achievement Award last week. Construction of the project was completed last year, 10 months early and \$20 million under budget.

“The ECCCE project required bringing 5,200 tons of cooling capacity to our strategic computing center,” said Kathy Segala, Associate Laboratory Director for Capital Projects at Los Alamos. “This successful project greatly improved the Laboratory’s high-performance computing capability and, by extension, our nation’s nuclear deterrent, well into the future.”

Each year, the Department of Energy recognizes projects that have demonstrated excellence in project management. Specifically, the Secretary’s Achievement Award is presented to project teams that have demonstrated significant results in completing projects under budget and ahead of schedule. This year, Los Alamos was one of three National Nuclear Security Administration laboratories to win the award.

LANL: How First Atomic Bomb Got Its Name

Los Alamos Reporter (7/19)

At the April 1943 Los Alamos Primer Conference, physicist Robert Serber used the word “bomb” as he began his now-famous lectures. According to Serber, this prompted Oppenheimer to take action: “After a couple of minutes Oppie sent (physicist) John Manley up to tell me not to use that word. Too many workmen around, Manley said. They were worried about security. I should use ‘gadget’ instead.”

NMSU Leads Clean Energy ‘Cluster’ Initiative

Las Cruces Sun-Times—Kevin Robinson-Avila (7/19)

NMSU’s Arrowhead Center, which manages all of the university’s entrepreneurship and technology-transfer programs, received a \$1 million grant from the U.S. Department of Energy in June, 2021, to build out a New Mexico Clean Energy Resilience and Growth Cluster, or NM CERG, at Arrowhead, said Arrowhead Deputy Director Dana Catron. Sandia National Laboratories and Los Alamos National Laboratory will collaborate on the project with lab resources and technical assistance for startups to develop, test, and prove their technologies.

[In Order to Prevent Another Pandemic, LANL Scientist Looks to the Sky](#)

KOB.com (7/21)

It's been nearly two years since COVID-19 jumped from bats to humans, resulting in a large-scale pandemic. Los Alamos National Laboratory is trying to get a head start on the next threat.

[New Quantum Research Gives Insights into How Quantum Light Can Be Mastered](#)

Los Alamos National Laboratory (7/21)

A team of scientists at Los Alamos National Laboratory propose that modulated quantum metasurfaces can control all properties of photonic qubits, a breakthrough that could impact the fields of quantum information, communications, sensing and imaging, as well as energy and momentum harvesting. The results of [their study](#) were released yesterday in the journal *Physical Review Letters*, published by the American Physical Society.

[Española Mayor Javier Sanchez Reacts to Announce \\$879,506 in Federal Funding for Broadband](#)

Los Alamos Reporter (7/22)

City of Española Mayor Javier Sanchez said thanks to Los Alamos National Laboratory who worked with the City's Planning Department, the City was able to fund the critical first step — a needs assessment study.

[New Discovery Could Power Quantum Information, Cryptography, Energy Harvesting](#)

Azoquantum.com (7/22)

A research group from Los Alamos National Laboratory has suggested that modulated quantum metasurfaces have the ability to regulate all properties of photonic qubits, a discovery that could influence the fields of quantum information, sensing and imaging, communications, as well as momentum and energy harvesting.